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## **Lightsup: Modern Organization for the Modern Living Room**

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# R I T

**Lightsup:  
Modern Organization for the Modern Living Room**

by  
Fang-Yi Lin

A Thesis submitted in partial fulfillment of the requirements for the degree of  
Master of Fine Arts in Industrial Design  
The School of Design College of Art and Design

Rochester Institute of Technology  
Rochester, NY  
November 11, 2020

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Fang-Yi Lin

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## **Abstract**

Studies show a cluttered home makes people feel anxious, helpless and overwhelmed. Home should be a place where people can relax and live comfortably. A messy house can lead to negative behavior, making people impatient and argumentative. An organized house can not only make people be in a good mood but also encourage harmonious relationships in a family. This paper puts forth how design can help people be more organized in their homes thus creating a relaxing environment. The research shows how clutter affects people's behaviors, emotions and relationships; why people do not organize; and the importance of finding a home for belongings within the home. In the next part, the author proposes a possible solution and its application in tracking objects to help organize people in their rooms better through reminders and alerts. This interaction helps cultivate the hobby to maintain the organization in the house. At the end of the paper, the author mentions the future potential of this solution.

***Keywords:*** House organized, Declutter, Living room, System design, Organization, Industrial design

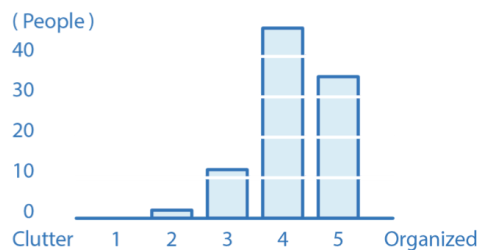
## **Introduction**

There is a surge of literary and self-help material on the internet focused on home organization, a mere search on e-commerce platforms like Amazon with the terms ‘organized house’ yields about 450 book results. Not only this, but there are TV shows addressing this subject and this has also given rise to celebrities and best-selling authors like Marie Kondo who is a lifestyle/cleaning guru. Kondo believes that A house does not become cluttered by itself, instead, the people living inside make it come to that (Kondo, 2014). And this approach is often reinforced through the “KonMari Method”. The most significant feature of this method is about only keeping the objects that will make you feel joyous so that people can mostly be surrounded by the items that reflect the happiness in the home. Living in clutter obstructs one from identifying with one’s own home, where too many things confined in a small space will make a person feel unwelcome and uncomfortable, as stated by Whitbourne (Whitbourne, 2017). If the house is too messy, it will influence not just physical movement and accessibility but also create negative emotions. That is why an organized home is an important part of people’s lives. This thesis will analyze how a cluttered house impacts people’s lives in different aspects, find the reasons leading to the clutter and suggest a solution to this issue.

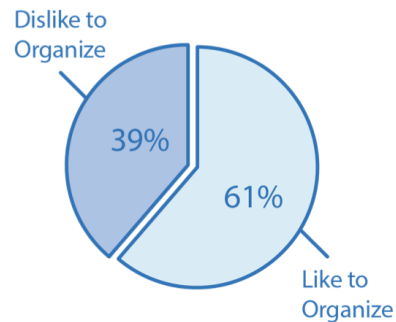
## Research

### 1. How People Feel About A Disorganized Home

People naturally want to be organized. According to my survey of 97 people, nobody prefers the house to be messy (*Figure 1*) and 61% of people enjoy tidying up the house (*Figure 2*). The response from one of the subjects attributed the positive outlook towards cleaning their own home to the feelings of accomplishment, satisfaction and refreshment. However, for the other set of people, the feeling was of frustration, annoyance and tiredness. Although most of the people like to be organized, the clutter issue is still a problem for many homes.



**Fig 1:** How organized do people prefer their house to be.



**Fig 2:** People's prefer of organizing

### 2. The Influence of The Disorganized

It is obvious that a messy environment hugely impacts a person's life, both mentally and physically (Carter, 2012). But these impacts can further affect the following four facets - behavior, mental health, physical health and relationships.

#### The Impact of the Environment on People's Behavior

“Feng Shui” is an ancient Chinese philosophy that believes in a universal life force or energy which affects people through surroundings and physical state. If a space is harmonizing, it can help people to organize their thoughts and emotions. The basics of Feng Shui are to essentially declutter and be tidy. Golangco states that keeping the space uncluttered can help people be more focused and maintain the clarity of the mind (Golangco, 2007). The cluttered space constructs scattered energies which apparently leads to mental and emotional conflicts. Whitbourne and Susan



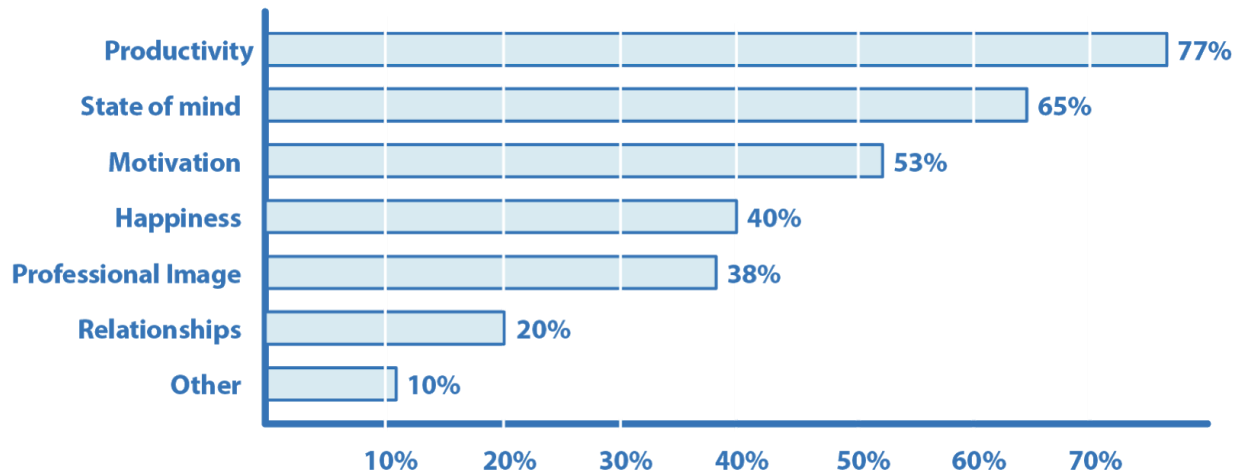
Krauss also propose the same point of view in the journal Psychology Today that a messy environment can easily distract people and make it difficult for them to focus. Disorganized spaces can also interrupt one's capability to move and think. If people enjoy their surroundings, it would make them think more effectively and clearly (Whitbourne, 2017).

The broken-window theory also supports that the environment influences people's behaviors. The study illustrates that focusing on maintaining and visual upkeep of environments can prevent crime and helps create an atmosphere of order and lawfulness, thereby preventing more serious crimes from happening (Kelling & WILSON, 1982).

Before Wilson and Kelling introduced the theory, Philip Zimbardo, arranged an experiment which is like the broken-window theory in 1969. This experiment demonstrates that the environment can influence people's behavior (Zimbardo, 1969). The other study looks at the organization and how the lack of it affects people's decisions in healthy food choices, financial generosity, creativity and preference for tradition (Vohs, Redden, and Rahinel 2013). The result shows that orderly environments advance convention and healthy choices, which could boost the quality of life by assisting people to follow social norms and behavior. A Disorganized environment stimulates creativity, which plays an important role in culture, business, and the arts. Organized and disorganized surroundings do affect people's manner of conducting themselves in different ways. Therefore, the organization can harness the positive energies and keep people healthy and efficient with clarity of mind.

### **Mental and Physical Impacts of Disorganization**

According to the author's research, 85 % of people think that clutter will influence their emotions. 65% of people consider that it will bring negative sentiments in them. The subjects responded that if they stay in a house that is disorganized, they will feel annoyed, angry, sad, uncomfortable, depressed and frustrated. The bar chart (*Figure 3*) is the survey from OfficeMax about the workspace organization in 2011. The chart shows 90% of Americans admitting that the clutter at home or work has a negative impact on their life. Their productivity (77 %), state of mind (65 %), motivation (53 %) and happiness (40 %) are affected when there is disorder (OfficeMax, 2011).



**Fig 3:** The negative emotions effect by clutter

In fact, one of the studies conducted through a Scottish Health Survey showed that 3,000 people affected by stress or anxiety were positively impacted through the implementation of physical activity in their daily schedule. It was shown that exercise at least once a week decreases the risks by 33%, while 20% by housework and walking (BBC NEWSv, 2008). Through the process of tidying up, people can feel refreshed and better.

People feel strongly unhappy if they own cluttered rooms; the people who have clean rooms feel an intense sense of happiness (Masuda, 2005). One study found that how a person described their homes related to their subsequent patterns of mood and cortisol, which shows that the environments can influence health as well (Saxbe & Repetti, 2009). One of the examples from the research showed that when people went to a disorderly home, it would directly spark stress and negative moods in them. People with hoarding behaviors often have symptoms of OCD, depression, anxiety, and attention-deficit hyperactivity disorder (Roster, 2014). Although in a general family, people will not usually have a case of hoarding, a disorganized house does bring some stress and anxiety to its members.

There are many reasons why disorganized spaces influence people in physical ways. From the health aspect, a cluttered environment will let the dirt accumulate easier which causes allergies and asthma (Wilson & Platts-Mills, 2018). Not just that, but cluttered spaces also make it easier for pests and molds to infiltrate the home (Heymann, 2009). A messy environment can also affect eating habits. A study about the role of mind-set in stressful and chaotic food environments explained a particularly important relationship between stress and eating choices which led to the

consequences associated with unhealthy eating and excess weight. The experiment showed that if people have a source of stress such as a noisy, disruptive, and disorganized environment, it can also impact individuals' eating behavior. Less cluttered environments may reduce the desire of eating snacks than in disorganized places (Vartanian, Kernan, and Wansink 2016). Therefore, an organized environment encourages people to eat healthier.

The other practical aspect is when a friend visits your home unexpectedly, a disorganized space will make people have feelings of guilt and embarrassment (Carter, 2012). Keeping the house in order takes the pressure out of such social interactions. The other advantage of organizing is saving time by not wasting the time on finding stuff in the clutter which makes people frustrated (Carter, 2012). Thus, the organization saves people's time through prioritization in a physical way. It is known that levels of cortisol and depression can affect long-term physical and psychological health.

### **Influence on Relationships**

The survey conducted for this thesis shows that 79% of people believe that clutter will influence their relationships and 60% of people have arguments with their family because of disorganization or housework involving the organization. Two kinds of relationships are the most affected by these disputes – live-in/newly married couples and parent-child relationships. Nowadays, the number of working couples has increased, focusing on household work brings many issues to the surface. A survey from Ikea in 2011 illustrated that 41% would not live together because of their 'clutter crimes'. 2.4 million UK couples argue about clutter up to 154 times a year, and they already debate twice a week about their clutter complaint. Disorganization could become an obstruction between couples by creating acrimony (IKEA, 2011). Another data demonstrates that almost 20% of men think that the household job is still a woman's responsibility, their opinion seems to create another argument in the home. A recent study advised that the husband's attitudes and behaviors in employment and family are vital to the wife (Gordon & Whelan-Berry, 2005). Thus, finding the balance in housework and taking primary responsibility for family and household together are the keys to decrease the arguments at home.

Another relationship that benefits from home organization is of parents and their children. A 2011 survey from OfficeMax shows that more parents than non-parents (34% vs. 27%) say that they don't have enough time to

organize their stuff and more of the same lot (40% vs. 32%) would likely lose their peace of mind if they were unorganized (OfficeMax, 2011). Through the survey, we can notice that parents could be more impatient which results in more fights. Another reason that leads to disputes is when parents tend to compel their children to clean their rooms. Parents cannot keep forcing their children to clean up their room, it would only cause more conflict and voluntary cleaning is the best way to go about decluttering (Dell'Antonia, 2015). Parents should set up the example for children as organization, as an activity, is contagious (Kondo, 2014). When one of the family members start to tidy up the house, the others will also start to do it. Ideally, every member in the house should share the responsibility for housework but it can definitely be initiated, as a habit or a family ritual.

### 3. Conclusion of Research- The reasons of disorganization

Having seen, through various examples, the ill effects of clutter on people's mental and physical well-being, we still need to know why clutter occurs in the first place. Surveys conducted in 2011 show that 29% of people interviewed blame not having enough time and 26% said that they do not have abundant space to avoid the organization of their workplace (OfficeMax, 2011). According to the author's interviews, about 50% of the people interviewed think that they do not stay organized because they are too lazy; 25.8% of people believe that reason is that they do not know the correct method to organize their homes; 15.1% of people deem that they are too busy to be organized. The result of these two surveys illustrates that there are four reasons why people cannot keep tidy homes - lack of time, no space, lack of organizational capabilities and lack of motivation (commonly known as laziness). As a result, organization should be easy to understand and to implement while requiring less time. (Figure 4)



**Fig 4:** The reasons of disorganized

## **4. Organizing Method**

### **Reduce the information in the house**

A house looks cluttered or organized according to the message that the mound of things sends. Carter states, in his 2012 study, that storing things away from sight really does not remove the visual stimuli that create the stress caused by clutter (Carter, 2012). If there are more things, it will easily send the message of messiness to people. People can use doors on the shelves or drawers to reduce such stimuli. But by hiding all the stuff inside, accessing them becomes inconvenient. Thus, when designing for the storage space, people can follow the 80/20 rule (Wei, 2016). Hide 80% of the mess and show 20% of the beauty. 80% of the things can be hidden (such as seasonal stuff, infrequently used things and basic commodities which are not easy to organize). The other 20% can be put outside and displayed (such as frequently used things and decorations). As a result, the stored objects would not only look organized but also create a mentally relaxing environment.

### **Steps of organization**

The organization can be divided into three steps:

#### **(1) Arrange Belongings:**

To decide which objects to keep in the house. By the steps of going through the belongings, people will treasure and feel grateful for what objects they own (Kondo, 2014).

#### **(2) Store Belongings:**

The end to an organization process only happens once all the things are in their right place (Kondo, 2014). If there is something that does not have a place, it is the mess (Stedman, 2011). Everything having its own place is one of the core points to keep the house in order.

#### **(3) Maintain Organization**

It is best to help all the items find their home and return them immediately after using them. When people keep repeating the action, they will naturally know the place of the objects. Therefore, people can reduce the time and decrease the anxiety of finding things (Oki, 2005).

There are a lot of books to teach people on how to arrange their belongings. For storage, there are a lot of products designed for aiding easy storage and saving space. However, there are no solutions that help people to maintain the organization. Thus, that is an opportunity for this project to focus on.

## **Importance of Returning After Using**

In Germany, people do not spend the time to clean their house, what they will do is clean before things get messy (Oki, 2005). Instead of saving all the cleaning work to one or two days a week, neat people clean while they are making the mess. If someone is cooking while cleaning, washing the dishes after eating and putting things back after using them become daily habits. As a result, there will be fewer heavy-duty tasks each week because the house stays relatively clean. The approach of cleaning before the invisible dirt becomes visible is one of the few brilliant ways of organizing without spending much time and effort (Oki, 2005). When the house becomes too messy, people need to spend more time and effort on cleaning thereby feeling extra tired at the end of it. Returning the things to their place is an important step for organizing. 'The action of putting the objects back to the designated space after using them immediately. It sounds simple, but it takes practice and commitment' (Carter, 2012). If people do not correctly put away the thing after using it, the stuff will start to pile up and create clutter. Cleaning before the house becomes dirty and restoring the item after using it can keep the house neat and thus avoid disorder.

## **Design solutions**

According to the research result, the author wishes to create an easy procedure to assist people in maintaining the organization of their homes. Making this easier also brings joy to the activity which makes it relatable to the homely environment people wish to be a part of.

### **1. Targets**

#### **Target User**

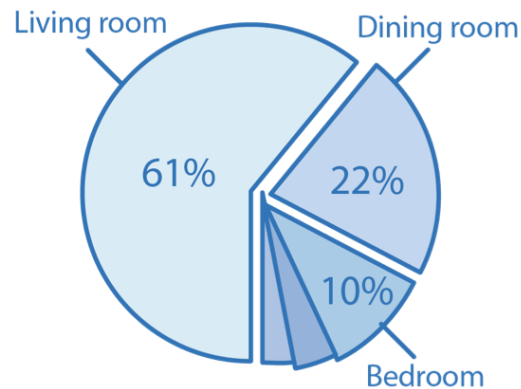
Based on the research, the disorganized house will influence the harmony of a family especially between couples and between parent and child. Thus, the product is creating for a family both with or without children.

## Target Area: Living room

The living room is the center of a home where families gather and interact among themselves and others. Gradually over time, it gathers most of the stuff from different family members and deposits 70% of ‘public’ objects (Wei, 2016). Living room storage holds different categories of objects of various family members, which is likely to get messy (*Figure 5*). According to the author’s survey, people spent most of their time conversing and relaxing with family in the living room (*Figure 6*). As a result, the organization of the living room is essential because its state cannot only affect the state of other spaces in a home but can also reduce the stress between the members and improve their inter-relationships.



**Fig 5:** Picture of a living room in a family with two kids.

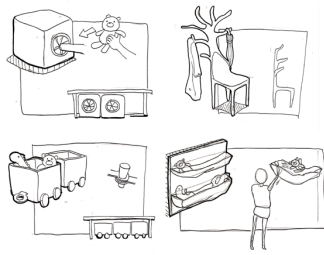


**Fig 6:** The place that spends the most time with family

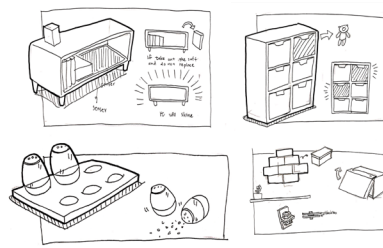
## 2. Development

### Initial Concepts

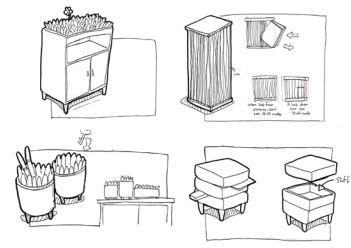
According to the results of the survey and research, three aspects of ideas were developed for solving the problem. Firstly, by using exciting ways to trigger people to be organized (*Figure 7*). The concept is that the product presents itself in an attractive and playful way to make people want to use it. The user will feel like playing during the orderly process. The second way is to hide the mess to make the environment look organized (*Figure 8*). People do not need to spend time in organizing the objects; they need to gather them in a place that hides them from plain sight. The third aspect is reminding people to return the thing to the site after using it (*Figure 9*). The product will keep reminding through visual or audio cues until the user puts the object back in its original place.



**Fig 7:** The concept 1



**Fig 8:** The concept 2



**Fig 9:** The concept 3

## Evaluate Testing of the Initial Concept

Based on the initial concept, I narrowed down to 5 ideas which have more interactions with people and interesting solutions to test out the function by making mock-up

### (1) **Tree chair** (Figure 10)

*Concept:* Using the branch shape to collect items in the same place that people can simply collect the messy.

*Result:* The branch looks messier after putting stuff on it. This concept did not make the environments look more organized.



**Fig 10:** Tree chair

### (2) **Balance season set** (Figure 11)

*Concept:* Using the shape feature to force people to put things back after using.

*Result:* The testing prototype worked well, but this concept was hard to apply to the living room environment.



**Fig 11:** Balance season set



### (3) **Grass container** (Figure 12)

*Concept:* Using the grass around the container to hide the messy.

*Result:* This prototype did work. However, this concept was too limited to develop.

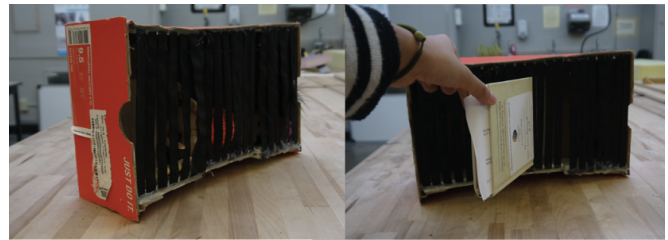


**Fig 12:** Grass container

### (4) **Invisible shelf** (Figure 13)

*Concept:* Using the string to create a surface to hide the items, but easy to take out and put back to make the environment looks organized.

*Result:* This prototype does present the concept well. Can play with the string pattern of the surface to increase the interest of the user.

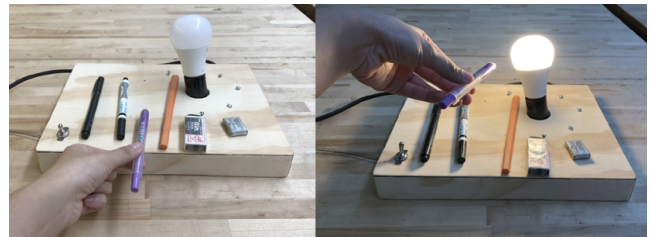


**Fig 13:** Invisible shelf

### (5) **Reminder shelf** (Figure 14)

*Concept:* Using the interaction to remind people to return the thing back to the place after using it to create the hobby of organizing.

*Result:* This testing prototype was hard to show the concept. However, this idea got positive responses and had the potential to develop.



**Fig 14:** Reminder shelf

By testing the three of these concepts using mockups with different users, it was finalized that the third solution is the most effective and feasible in countering this problem. Other reasons include:

- (1) House will be organized before becoming too cluttered.
- (2) Less cumbersome process saves time and effort.
- (3) Sustains the long-term organization.
- (4) It solves the root of the problem by organizing more directly.

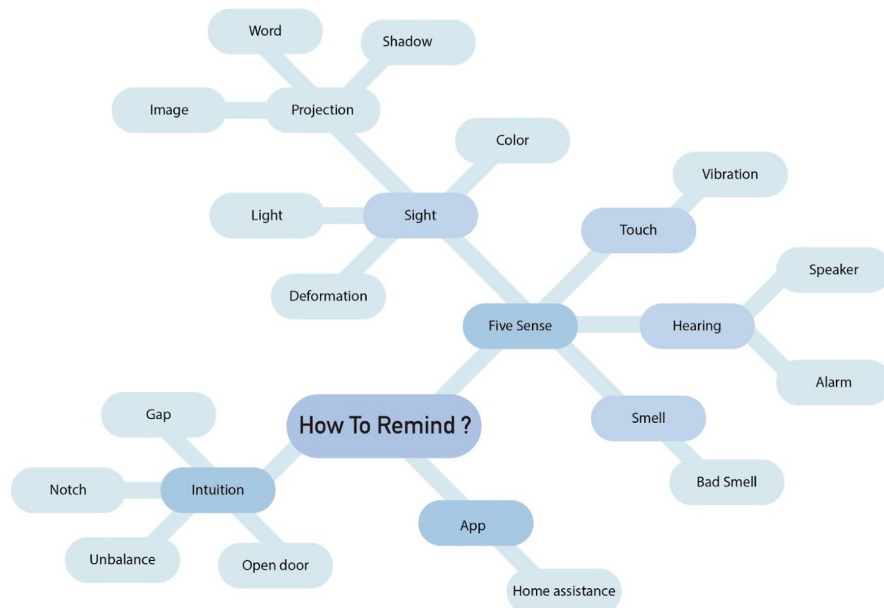
## Developing the Interaction

The previous testing and explorations are more focused on finding the problem and the practical solution. This stage studies the interaction of people with the objects, i.e. how will the product respond; and what the user feels about the response. Through this observational testing method, the interactions for the most efficient and friendly experience were selected and refined.

### The interactions were broken down further to address five key elements:

- (1) Remind people to put things back
- (2) Easy to operate (ease of access and retrieving objects)
- (3) Aesthetically friendly, inviting interaction and use.
- (4) Neatly fits a variety of environments
- (5) Specifies the objects that need to be returned to place.

Figure 15 shows the mind map of interaction development. Considering how different senses can bring diverse recalling or reminding methods for the user.



**Fig 15:** Mind Map of interaction development

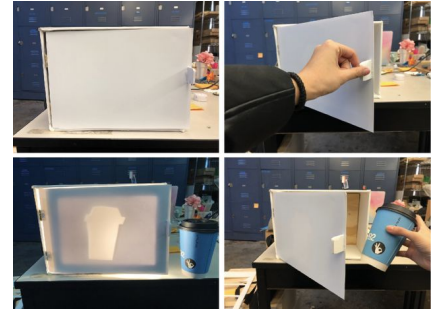
### Three User Testing Model:

These ideas of interaction were refined as tangible mockups and then tested with multiple users.

#### (1) Model 1 (Figure 16)

*Interaction:* Light will turn on and keep lighting if the user doesn't put the things back.

*Reminder:* The sensor will capture the outline of the object and show it on the door.

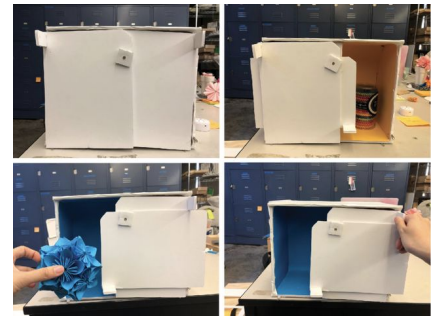


**Fig 16:** Model 1

#### (2) Model 2 (Figure 17)

*Interaction:* The door remains open (only one door at one time) if the user doesn't return the things in place.

*Reminder:* User needs to put things back if they want to use other stuff to access the other door. Different colors inside signify different categories of objects.

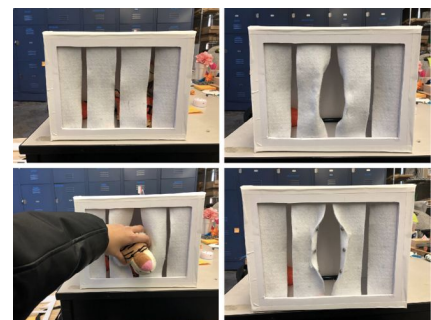


**Fig 17:** Model 2

#### (3) Model 3 (Figure 18)

*Interaction:* Forms to the contour of the object while it is being taken out and the shape will keep open.

*Reminder:* The magnet on the strip will form to the contour reminder later through the void left in place.



**Fig 18:** Model 3




### The goals of testing

- (1) The appearance preferences
- (2) Does it remind people whether something is missing?
- (3) Does it remind people of what they need to put back?
- (4) Preference among the interactions




(5) Which do people willing to put at home?

### The result:

People prefer the interaction of model 1 as it is simple and straightforward. People also like the feeling of the soft material of model 3. The final solution will combine the two figures. Further details of the results are given in figure 19 and figure 20 below.

		Appearance Preference	Remind people of a missing object	Remind people what return	Preference of the interactions	Willing to put at house
1		● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●
2		● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●
3		● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●

**Fig 19:** Interaction user texting result

	Positive Feedback	Negative Feedback
1 	Straightforward Interaction. Willing to put things back. Want to turn off the light. Decoration of the room.	Technology is too complex. People might neglect the light.
2 	Good for teaching kids. Color is elegant. Restricts the mess. Stand careful appreciation.	Can't take multiple things. Feel frustrated. Color doesn't remind what to put back.
3 	Like the feeling of soft material. Fit in house. Fun interaction. Reminder is straightforward. East to retrieve stuff.	Things smaller than the hand not registered. Visually cluttered. Feeld like an Obstacle. Insides are visible.

**Fig 20:** Interaction user texting result- feedback

### 3. Design Solution- Lightsup



**Fig 21:** Lightsup image 1. Photo by Elizabeth Lamark

The final solution is in the form of a piece of furniture, a television cabinet that tracks objects as they leave their designated space in the living room (*Figure 21*). It uses a simple interaction, which utilizes light and shadow projection to remind people to return objects to their original place after using them (*Figure 22*). The reason why this design opts to go with a television cabinet is that it is the most common storage place in the living room and easy for children to reach. The angled edges of the door bring the functionality of a handle while making it more accessible and visually cleaner. The raised body creates space which makes cleaning easier and reduces dust accumulation. The material choice is based on a survey of 97 people who preferred using lighter colors and a preference for wooden furniture to decorate the house. The reason for applying the fabric material (Xue, Zeng, and Koehl 2013) on the door is not only so that the light can pass through it easily but also because people prefer the appearance and tactile sensation of fabric for home furniture. The other feature uses shadow projection instead of a real picture because the information from a real picture could complicate the vision of people and make the environment look messy. Showing the shadow can minimize the visual information to keep the house simple and not distracting.



**Fig 22:** Lightsup image 2. Photo by Elizabeth Lamark

## Benefits

The primary purpose of Lightsup is to organize the house by cultivating the hobby of the user to put the objects back after using. Through this hobby, there will be less heavy-duty tasks each week because the house stays relatively orderly. The house could remain organized before the clutter accumulates. It will save people time and effort usually spent in the organization. Developing a habit in line with a natural sequence can easily maintain the cleanliness and the comfort of the house. Returning the objects to the place after using them, though seems simple, can however as a hobby have a massive change in the house organization involving all the members of the home.

## The Technology System

For this design to work, multiple steps using current-day technology are involved. These are illustrated through the points given below (and in *Figure 23*):

- (1) The user takes a picture of the object with an app.
- (2) The app will then convert the photo into a monochromatic image and save it to a lookup table which connects with Lightsup.

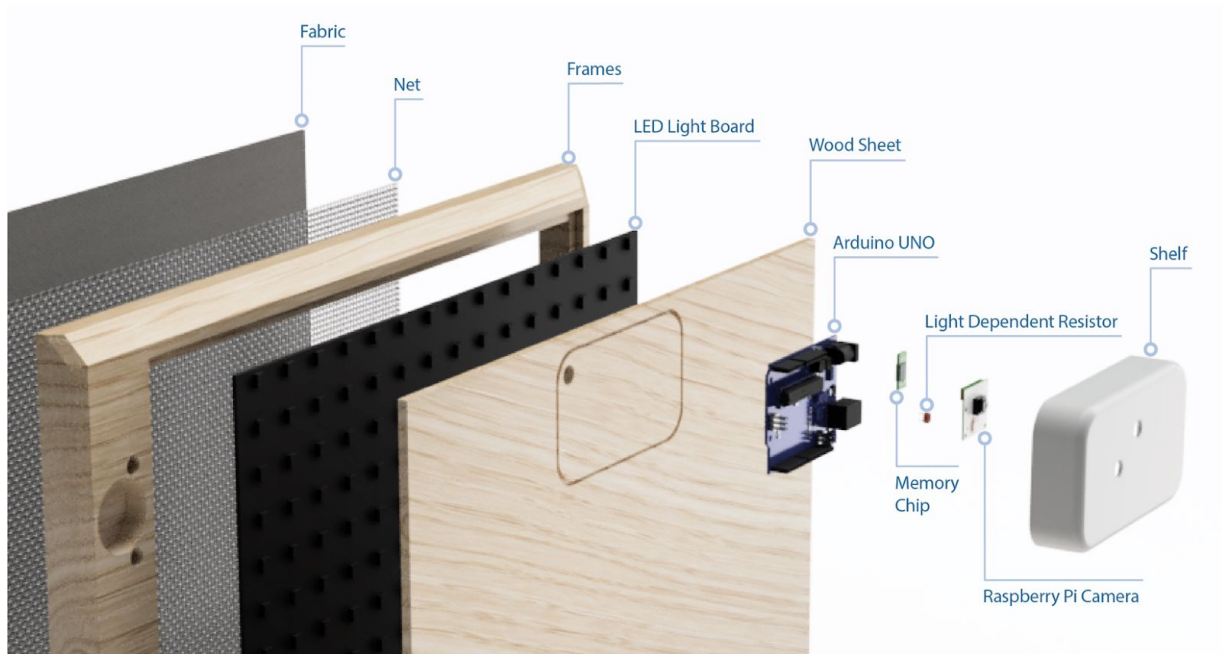


- (3) There is a sensor which can detect the movement of the door
- (4) When the user opens the door, it will switch the camera on to scan the insides of the cabinet.
- (5) The image will be compared with the last picture to see which object is missing
- (6) The shadow of the missing object will be projected on the door after an hour to remind the user to put the things back.



**Fig 23:** The system wireframe

Figure 24 illustrates the components of the door that might be used in the design.



**Fig 24:** Explore View of the door design

## Future Opportunity

Lightsup can be utilized not only as a piece of furniture but can also be used in a home system (*figure 25*) which brings smart home technology into people's lives. Tracking the objects in the house can let the user become aware of the amounts of the things they own in order to change their perspective of their belongings – i.e. what is to be cherished about what they have. There are three aspects that this system can assist the user in recognizing their belongings. First, this system can tell the time of use of an object. To be more specific, people often keep useless stuff that they would not use for several years which produces clutter. This design can track the items that people did not move for a month. So people can reconsider whether they really need to own a particular thing or not. Secondly, it tracks the numbers of belongings. Keeping a track of the belongings can effectively reduce the clutter in the house. People can know what they have and avoid purchasing the same object if they already have it. Thirdly, it sets alarms for using an object. A parent can set the object-use clock for the child to teach them about time management. A new awareness towards the things they own can influence the buying habits and eventually the organization of the home-space.



**Fig 25:** Envision of the Future ( Living Room Image: Chien, Than. *Pixabay*, 2015,

[pixabay.com/photos/furniture-living-room-modern-998265/](https://pixabay.com/photos/furniture-living-room-modern-998265/). Accessed: Nov.03.2020

People Image: Diverse people using their phones, Awpixel, <https://www.rawpixel.com/image/586868/friends-social-media>.

Accessed: Nov.03.2020)



## Conclusions

The organization of a home is a complicated issue influenced not just by modern-day consumption patterns but also by human behavior as crucial factors. Though multiple methods have been proposed and work to certain extents, not everyone is able to apply or practice these effectively. But, by the application of cutting-edge computer science (3D object detection and lookup tables) and a more user-friendly, homely designed furniture, the home organization can be made into an easier and more approachable task. Lightsup, the proposed solution, keeps a track of the objects kept in it and informs the user when they are missing. By watching over the logistics of the things at home, especially in the living room (a small step but influential on a family's behaviors) physical and visual clutter can be reduced thus creating a decluttered and relaxing environment for decluttered minds.

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